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Evaluation of adrenocortical function in Florida manatees (*Trichechus manatus latirostris*).

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Source

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Abstract

The study objectives were to determine the predominant manatee glucocorticoid; validate assays to measure this glucocorticoid and adrenocorticotrophic hormone (ACTH); determine diagnostic thresholds to distinguish physiological vs. pathological concentrations; identify differences associated with sex, age class, female reproductive status, capture time, and lactate; and determine the best methods for manatee biologists and clinicians to diagnose stress. Cortisol is the predominant manatee glucocorticoid. IMMULITE 1000 assays for cortisol and ACTH were validated. Precision yielded intra- and inter-assay coefficients of variation for serum cortisol: ≤ 23.5 and $\leq 16.7\%$; and ACTH: ≤ 6.9 and $\leq 8.5\%$. Accuracy resulted in a mean adjusted $R(2) \geq 0.87$ for serum cortisol and ≥ 0.96 for ACTH. Assay analytical sensitivities for cortisol (0.1 $\mu\text{g}/\text{dl}$) and ACTH (10.0 pg/ml) were verified. Methods were highly correlated with another IMMULITE 1000 for serum cortisol ($r=0.97$) and ACTH ($r=0.98$). There was no significant variation in cortisol or ACTH with sex or age class and no correlation with female progesterone concentrations. Cortisol concentrations were highest in unhealthy manatees, chronically stressed by disease or injury. ACTH was greatest in healthy free-ranging or short-term rehabilitating individuals, peracutely stressed by capture and handling. Cortisol concentrations ≥ 1.0 $\mu\text{g}/\text{dl}$ were diagnostic of chronic stress; ACTH concentrations ≥ 87.5 pg/ml were diagnostic of peracute stress. In healthy long-term captive manatees, cortisol (0.4 ± 0.2 $\mu\text{g}/\text{dl}$) and ACTH (47.7 ± 15.9 pg/ml) concentrations were lower than healthy free-ranging, short-term rehabilitated or unhealthy manatees. Capture time was not significantly correlated with cortisol; ACTH correlation was borderline significant. Cortisol and ACTH were positively correlated with lactate.

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